

IN THE CLAIMS:

1. (currently amended) A method of protecting an x-ray analyzer comprising:
 - applying a high voltage to a x-ray tube;
 - monitoring a discharge phenomenon that occurs in an x-ray generating system as a pulse array representing fluctuations of the x-ray tube voltage caused by the discharge phenomenon;
 - counting a pulse number of the pulse array; and
 - terminating the high voltage output to the x-ray tube when the pulse number reaches a predetermined value.

2. (original) An electric discharge detection circuit comprising:
 - an X-ray tube;
 - a power supply to generate a high voltage applied to the x-ray tube;
 - an x-ray tube voltage detector to detect the high voltage applied to the x-ray tube;
 - a differentiation circuit to differentiate a signal output from the x-ray tube voltage detector;
 - a zero-crossing comparator to discriminate a polarity of an output signal from the differentiation circuit;
 - a re-triggerable one-shot pulse generating circuit that generates a one-shot pulse at a fixed period, a pulse output from the zero-crossing comparator being a trigger of the one-shot pulse generating circuit;
 - a counter, having a one-shot pulse output from the one-shot pulse generating circuit input as a operation enable signal, to count pulses output from the zero-crossing comparator during a period when operation is enabled;
 - an x-ray cut-off circuit to transmit a command signal to the power supply to stop generation of high voltage when receiving a carry output from the counter; and
 - a display to display occurrence of an electric discharge phenomenon upon receipt of the carry output from the counter.

3. (once amended) An electric discharge detection circuit comprising:

- an X-ray tube;
- a power supply to generate a high voltage applied to the x-ray tube;
- an x-ray tube voltage detector to detect the high voltage applied to the x-ray tube;
- a discrimination circuit to discriminate between substantial changes caused by discharge phenomenon in a signal output from the x-ray tube voltage detector within a predetermined time period;
- an x-ray cut-off circuit to terminate generation of the high voltage by the power supply when a number of the substantial changes in the signal output from the x-ray tube voltage detector within the predetermined time period exceeds a preset amount; and
- a display to display the preset amount has been exceeded.

4. (currently amended) A method for detecting electric discharges of electricity applied to an x-ray tube, comprising the steps of:

- monitoring and identifying fluctuations of a voltage on the x-ray tube;
- counting the voltage fluctuations for a predetermined time period; and
- determining that electric discharges occur when a count of the voltage fluctuations reaches a predetermined value within the predetermined time period.

5. (previously added) A method of claim 4, further comprising the step of resetting the count when the predetermined time period elapses.

6. (previously added) A method of claim 5, further comprising the step of starting the predetermined time period when a first fluctuation is identified after the count is reset.

7. (currently amended) A device for detecting electric discharges of electricity applied to an x-ray tube, comprising:

- a monitor that monitors a voltage on the x-ray tube and identifies fluctuations of the voltage;

a counter that counts the voltage fluctuations for a predetermined time period; and
a cut-off circuit that cuts off supply of electricity to the x-ray tube when a count of the
voltage fluctuation reaches a predetermined value for the predetermined time period.

8. (previously added) A device of claim 7, wherein the monitor includes a differentiation circuit
that transforms the voltage fluctuations into pulse arrays.

9. (previously added) A device of claim 8, further comprising a chronometer that starts clocking
the predetermined time period upon detection of a first pulse of a pulse array.

10. (previously added) A device of claim 9, wherein the counter starts counting the pulse array
from the first pulse and is reset by the chronometer when the predetermined time period elapses.